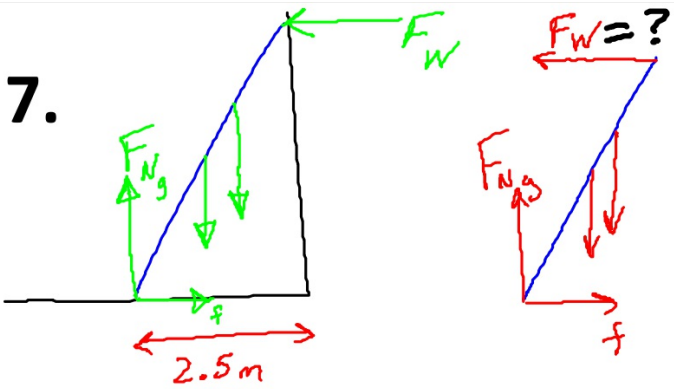
7.



$\sin\theta = \frac{2.5}{5}$

$\theta = 30°$

$$\Sigma \tau_{ground} = 0 \quad \text{(in is +)}$$

$$\vec{r} \times \vec{F}_g + \vec{r} \times \vec{F}_g - \vec{r} \times \vec{F}_W = 0$$

$$(2.5)(98_N)\sin 30° + (3)(735)\sin 30° - (5_m)(F_W)\sin 60° = 0$$

$$283N = F_W$$

b) & c)

$$\Sigma F_x = 0$$

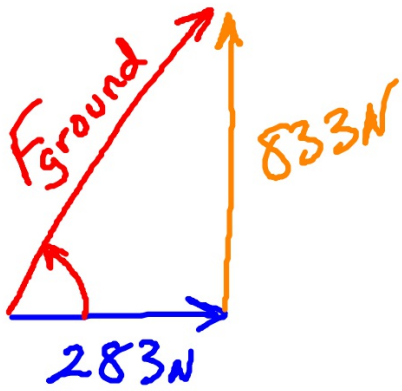
$$f_s - F_w = 0$$

$$f_s = 283N$$

$$\Sigma F_y = 0$$

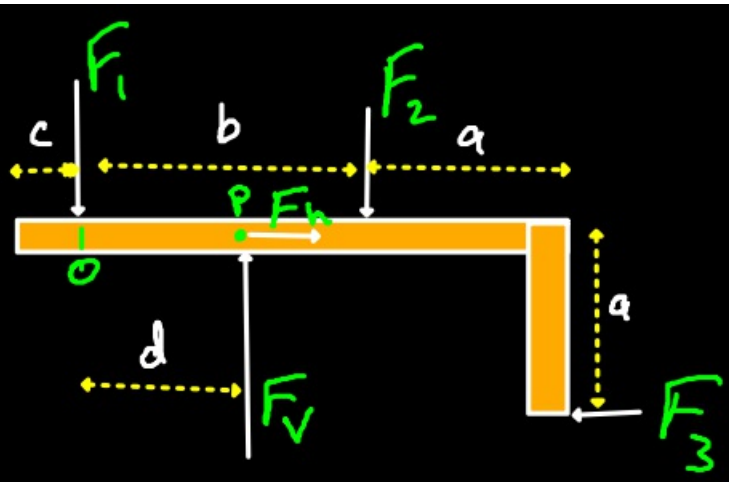
$$F_{N_g} - F_g - F_{g_2} = 0$$

$$F_{N_g} = 833N$$



$F_{ground} = 880N, 71°$

15.



$a = 2m$
$b = 3m$
$c = 1m$
$d = ?$

$F_1 = 20N$
$F_2 = 10N$
$F_3 = 5N$

$F_h = ?$ $F_V = ?$

$\Sigma F_x = 0$

$F_h - F_3 = 0$

$F_h - 5N = 0$

$F_h = 5N$

$\Sigma F_y = 0$

$F_V - F_1 - F_2 = 0$

$F_V - 20 - 10 = 0$

$F_V = 30$

$\Sigma \tau_o = 0$ $\tau = \vec{r} \times \vec{F} = (r_\perp)(F)$

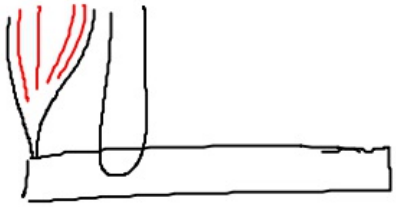
I'll make out (+)

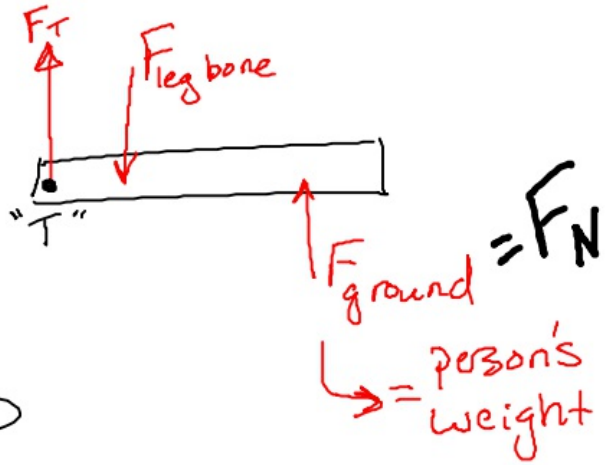
$(d)(F_V) - (b)(F_2) - (a)(F_3) = 0$

$d(30) - (3)(10) - (2)(5) = 0$

$d = 1.3\,m$

13.





$$\Sigma F_y = 0$$

$$F_T - F_{bone} + F_{ground} = 0$$

$$\Sigma \tau_T = 0$$

$$+\vec{r} \times F_{bone} - \vec{r} \times \vec{F}_g = 0$$

$F_B = 3600N$ (down)

$$(0.05)F_b \sin 90° - (0.2)(900N)\sin 90° = 0$$

$$\Sigma F_y = 0$$

$$F_T - F_B + F_N = 0$$

$$F_T - 3600 + 900 = 0$$

$$F_T = 2700N$$

c) $d = ?$

$\tau_3 = (r_\perp)(F)$

$\sum \tau_P = 0$

$-(d)(F_1)\sin 90^\circ + (b-d)F_2 \sin 90^\circ + (a)F_3 = 0$

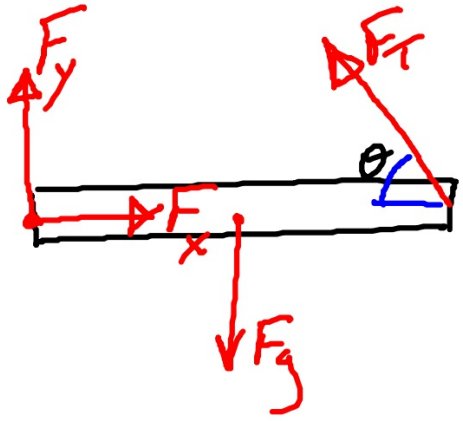
$-20d + (3-d)(10N) + (2)(5) = 0$

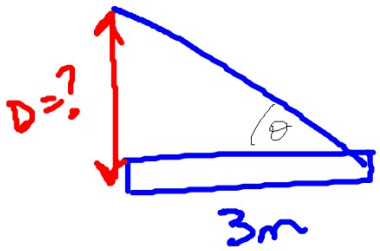
$-20d + 30 - 10d + 10 = 0$

$-30d = -40$

$d = 1.33m$

17.





$\tan\theta = D/3$

$\tan 12.02 = D/3$ $\quad D = 0.64_m$

$\Sigma \tau_{hinge} = 0$

$\left(\frac{L}{2}\right)(F_g)\sin 90° - L F_T \sin\theta = 0$

$250N - 1200\sin\theta = 0$

$\theta = 12.02°$